

PICTURE OF THE MONTH

Clearing of Winter Fog in the Central Valley of California

RALPH K. ANDERSON

National Environmental Satellite Center, ESSA, Washington, D.C.

The two satellite views presented here show the decrease in valley fog which took place between Jan. 7 and 8, 1969, as a front passed southward across California. The wintertime radiation fogs that form in the Central Valley of California often become quite deep and persist for many days. A break in the fog regime comes with a frontal passage and accompanying changes in wind flow and stability. On occasion, these changes result in only a partial clearing of the valley. The exact extent of the clearing which takes place for a given situation is clearly revealed in satellite pictures. Satellite observations are quite useful in studying how changes in the areal extent of the fog relate to changes in the flow pattern (figs. 1-4).

In the ESSA-7 view (fig. 1), the highly reflective area of fog fills the entire valley from (E) to (F). Over the ocean south of Monterey Bay, low stratus hugs the coastline, a reflection of the stagnant, anticyclonic flow that dominated the area for many days. At the time of the

picture, the jet stream was moving southward in advance of a short-wave trough which was approaching Washington. The jet extends northeastward from (G) and crosses the coast near Portland, Oreg. From the coast eastward, it parallels the well-defined, sharp northern edge of the frontal cloud band. The front at the surface extends from (F) to (H).

By 1800 GMT on January 8, the front had moved to southern California near Los Angeles. The ESSA-8 picture (fig. 3) locates the frontal cloud band (G) through (H) near the southern portion of the valley. The cloud band is considerably narrower than on the previous day. A band of cirrus associated with the jet stream crosses the coastline at San Francisco and extends eastward across the fog into western Nevada.

Note that the frontal passage dispersed most of the fog in the Sacramento Valley, but left a large amount of fog (I) in the San Joaquin Valley. The front, in this case,

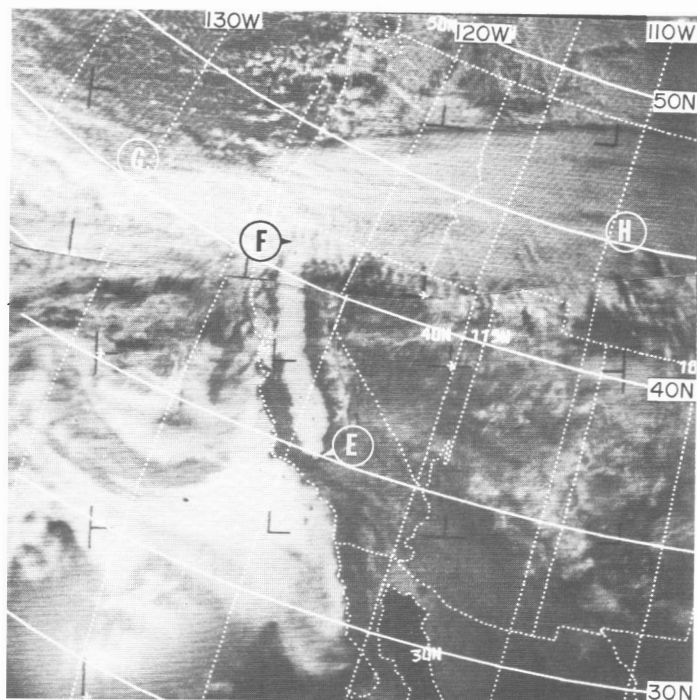


FIGURE 1.—California fog as depicted by an ESSA-7 picture, Pass 1808, at 2157 GMT on Jan. 7, 1969.

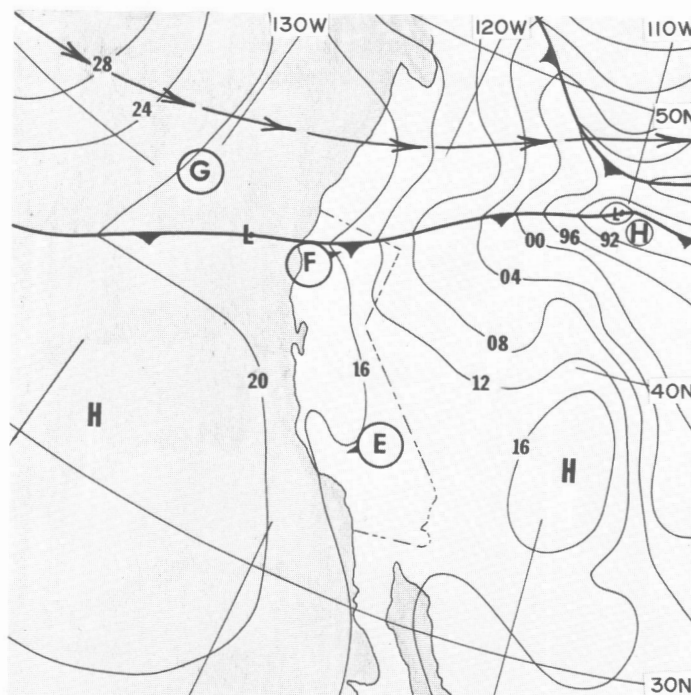


FIGURE 2.—Surface analysis at 2100 GMT on Jan. 7, 1969, and jet stream position at 0000 GMT on Jan. 8, 1969.

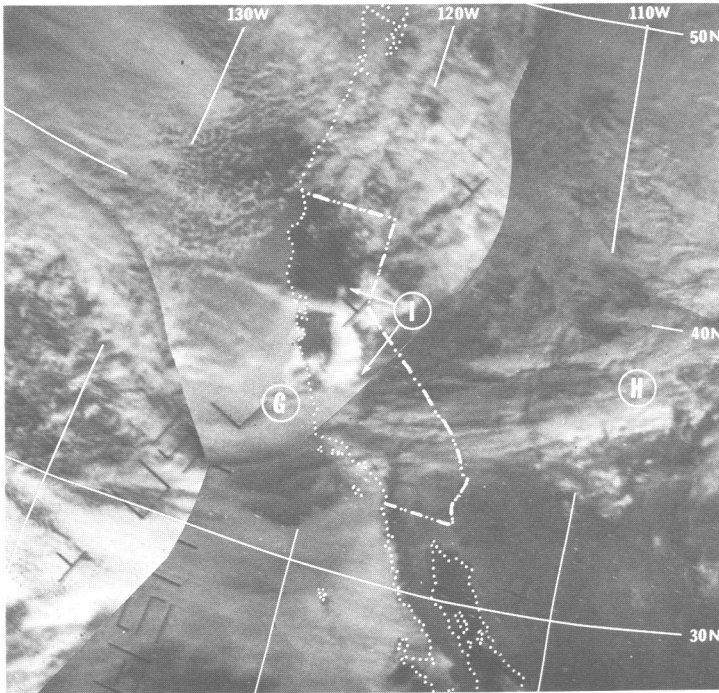


FIGURE 3.—California fog as shown by an ESSA-8 picture, Pass 301-302, at 1640-1835 GMT on Jan. 8, 1969.

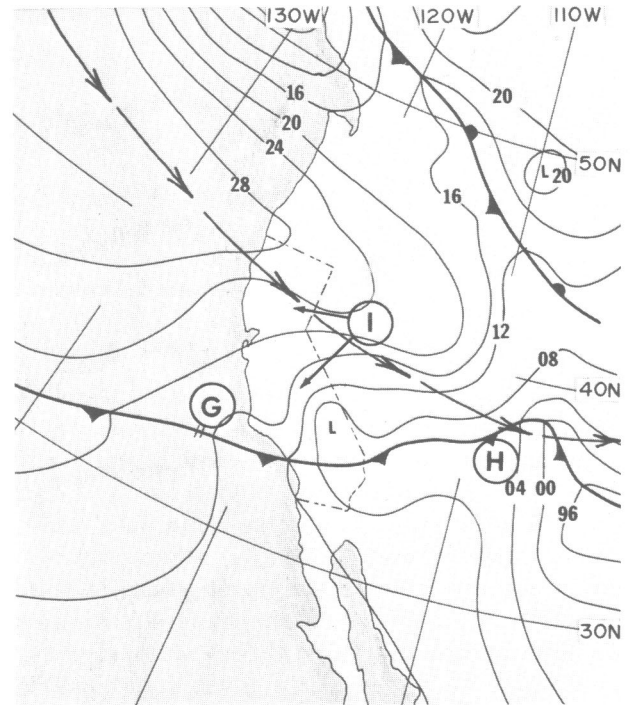


FIGURE 4.—Surface analysis at 1800 GMT on Jan. 8, 1969, and jet stream position at 0000 GMT on Jan. 9, 1969.

was not strong enough to penetrate the stable layer at the southern end of the valley. More clearing occurred on the western side of the central portion of the valley than on the eastern side, which is probably due to the combined effect of wind direction and terrain. The narrowing of the frontal cloud band as it moves southward

may also contribute to the fog persisting in the southern end of the valley. As the clouds with the front become thinner and narrower, the cloud band becomes less effective in inhibiting the radiational processes responsible for the fog.